IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Erik J. SHAHOIAN et al.
----------------------	-------------------------

Serial No.: Unassigned Examiner: Unassigned

Confirmation No.: Unassigned Art Unit: Unassigned

Filed: Herewith

For: HAPTIC FEEDBACK DEVICE WITH BUTTON FORCES

U.S. Patent and Trademark Office 2011 South Clark Place Customer Window, Mail Stop Patent Application Crystal Plaza Two, Lobby, Room 1B03 Arlington, VA 22202

publication.

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §1.97(b)

In accordance with the duty of disclosure set forth in 37 C.F.R. §1.56, Applicant(s) hereby submits the following information in conformance with 37 C.F.R. §\$1.97 and 1.98.

[]	Pursuant to 37 C.F.R. §1.98, a copy of each document cited in the attached Form PTO/SB/08 is enclosed.
[x]	No copies of the publications listed on the attached Form PTO/SB/08A are being provided pursuant to 37 C.F.R. §1.98(d) because the publications were previously cited by or submitted to the Office in prior Application Serial No. 09/741,310 to which the above-identified application claims priority under 35 U.S.C. §120.
[]	Publication(s) listed on the attached Form PTO/SB/08A were cited in a foreign search or examination report corresponding to application serial no and mailed on
[]	Enclosed is a copy of a non-English publication(s) Pursuant to §609 of the M.P.E.P., Applicant submits the attached foreign search or examination report, which cites such non-English language publication(s).
[]	Enclosed is a copy of a non-English publication(s) English language

publication ___ (copy enclosed) claims priority from this non-English

[]	Enclosed is an explanation of non-English publication(s)	for which an
	English translation is not available.	

- [] Enclosed is an English translation of non-English publication(s) __cited in the attached Form PTO/SB/08A.
- [] Enclosed is a copy of pending patent Application Serial No. ___.

This Information Disclosure Statement is filed within any one of the following time periods:

- [x] within three months from the filing date of this national application other than a CPA under 37 C.F.R. § 1.53(d);
- [] within three months from the date of entry of the national stage as set forth in 37 C.F.R. §1.491 in this international application;
- [] before the mailing date of a first office action on the merits; or
- [] before the mailing of a first office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

It is respectfully requested that the Examiner consider the above-noted information and return an initialed copy of the attached Form PTO/SB/08A to the undersigned.

Dated: February 23, 2004

Respectfully submitted, COOLEY GODWARD LLP

Cooley Godward LLP ATTN: Patent Group One Freedom Square Reston Town Center 11951 Freedom Drive Reston, VA 20190-5656

Tel: (703) 456-8000 Fax: (703) 456-8100

195833 v1/RE 473T01!.DOC By:

Erik B. Milch Reg. No. 42,887

_
+

Substitute for form 1449A/PTO			Complete if Known		
l _{tai}	INFORMATION DISCLOSURE		Application Number		
STATEMENT BY APPLICANT		Filing Date	Herewith		
		First Named Inventor	Erik SHAHOIAN		
	(use as many sheets as necessary)		Group Art Unit		
(not no many sheets as necessary)		Examiner Name			
Sheet	1	of	9	Attorney Docket Number	IMMR-046/02US

			U.S. P	ATENT DOCUMENTS	
		U.S. Patent D	ocument		Date of Publication of Cites
	Cite No.1	Number	Kind Code ² (if known)	Name of Patentee or Applicant of Cited Document	Document MM-DD-YYYY
		6,243,078		Rosenberg	06/2001
		6,219,032		Rosenberg et al.	04/17/2001
		6,166,723	_	Schena et al.	12/26/2000
		6,128,006		Rosenberg	10/03/2000
		6,100,874		Schena et al.	08/08/2000
		6,088,019		Rosenberg	06/11/2000
		6,088,017		Tremblay et al.	06/11/2000
		6,078,308		Rosenberg et al.	06/20/2000
		6,037,927		Rosenberg	03/14/2000
		6,028,593		Rosenberg et al.	02/22/2000
		6,024,576		Bevirt	02/15/2000
		6,020,876		Rosenberg et al.	02/01/2000
		6,004,134		Marcus et al.	12/21/1999
		6,001,014		Ogata et al.	12/14/1999
-		5,990,869		Kubica et al.	11/23/1999
		5,987,437		Nishiumi et al.	04/27/1999
		5,986,643		Harvill et al.	11/16/1999
		5,973,689		Gallery	10/26/1999
		5,959,613		Rosenberg et al.	09/28/1999
		5,956,484		Rosenberg et al.	09/21/1999
		5,956,016		Kruenzner et al.	09/21/1999
		5,944,151		Jakobs et al.	08/31/1999
		5,929,846		Rosenberg et al.	07/27/1999
		5,914,705		Johnson et al.	06/22/1999
	† †	5,912,661		Siddiqui	06/15/1999
		5,889,670		Schuler et al.	03/30/1999
	 	5,880,714		Rosenberg et al.	03/09/1999
		5,844,392		Peurach et al.	12/01/1998
		5,831,408		Jacobus et al.	11/03/1998
**		5,825,308		Rosenberg	10/20/1998
		5,821,921		Osborn et al.	10/13/1998
	 	5,808,603		Chen	09/15/1998
	 	5,805,140	1	Rosenberg et al.	09/08/1998
	 	5,802,353		Avila et al.	09/01/1998
	 	5,790,108	1	Salcudean et al.	08/04/1998
	 	5,785,630	 	Bobick et al.	07/28/1998
		5,784,052		Keyson	07/21/1998
	 	5,781,172		Engel et al.	07/14/1998
		5,771,037	 	Jackson	06/23/1998
		5,769,640		Jacobus et al.	06/23/1998
	I	3,709,040	l .	Jacobus et al.	U0/23/1998

Examiner	Date		
Signature	Considered	ł	

Unique citation designation number.
 See attached Kinds of U.S. Patent Documents.

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO

Sheet

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

of

9

Complete if Known			
Application Number			
Filing Date	Herewith		
First Named Inventor	Erik SHAHOIAN		
Group Art Unit			
Examiner Name			
Attorney Docket Number	IMMR-046/02US		

	5,767,839	Rosenberg	06/16/1998
	5,757,358	Osga	05/26/1998
	5,755,577	Gillio	05/26/1998
	6.555.016	· Sinclair et al.	06/16/1998
	5,754,023	Roston et al.	05/19/1998
	5,745,715	Pickover et al.	04/28/1998
	5,742,278	Chen et al.	04/21/1998
	5,739,811	Rosenberg et al.	04/14/1998
	5,736,978	Hasser et al.	04/07/1998
	5,734,373	Rosenberg et al.	03/31/1998
	5,731,804	Rosenberg	03/24/1998
	5,724,278	Chen et al.	04/21/1998
	5,724,106	Autry et al.	03/3/1998
	5,721,566	Rosenberg et al.	02/24/1998
	5,714,978	Yamanaka et al.	02/03/1998
	5,709,219	Chen et al.	01/20/1998
	5,694,013	Stewart et al.	12/02/1997
	5,691,898	Rosenberg eet al.	11/25/1997
	5,691,747	Amano	11/25/1997
	5,666,473	Wallace	09/09/1997
			
	5,666,138	Culver	09/09/1997
	5,656,901	Kurita	08/12/1997
	5,643,087	Marcus et al.	07/1997
	5,642,469	Hannaford et al.	06/24/1997
	5,629,594	Jacobus et al.	05/13/1997
	5,625,576	Massie et al.	04/29/1997
	5,596,347	Robertson et al.	01/21/1997
	5,591,082	Jensen et al.	01/07/1997
	5,589,854	Tsai	12/1996
	5,589,828	Armstrong	12/1996
	5,587,937	Massie et al.	12/24/1996
	5,583,407	Yamaguchi	12/10/1996
	5,577,981	Jarvik	11/26/1996
	5,576,727	Rosenberg et al.	11/19/1996
	5,565,887	McCambridge et al.	10/15/1996
	5,547,382	Yamasaki et al.	08/20/1996
	5,542,672	Meredith	08/06/1996
	5,530,455	Gillick et al.	06/25/1996
	5,513,100	Parker et al.	04/30/1996
	5,512,919	Araki	04/30/1996
	5,506,605	Paley	04/09/1996
	5,491,477	Clark et al.	02/13/1996
	5,473,344	Bacon et al.	12/05/1995
	5,466,213	Hogan et al.	11/14/1995
	5,459,382	Jacobus et al.	10/17/1995
	5,457,479	Cheng	10/10/1995
	5,451,924	Massimino et al.	09/1995
	5,414,337	Schuler	05/1995
	5,405,152	Katanics et al.	04/11/1995
	5,399,091	Mitsumoto	03/21/1995
	5,398,044	Hill	03/14/1995
	5,396,266	Brimhall	03/07/1995
	5,389,865	Jacobus et al.	02/14/1995
	7,307,003		
	5,381,080	Schnell et al.	01/10/1995

Examiner	Date
Signature	Considered

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Substitute for form 1449A/PTO

Sheet

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

of

Complete if Known			
Application Number			
Filing Date	Herewith		
First Named Inventor	Erik SHAHOIAN		
Group Art Unit			
Examiner Name			
Attorney Docket Number	IMMR-046/02US		

	5,355,148	Anderson	10/11/1994
	5,354,162	Burdea et al.	10/11/1994
	5,341,459	Backes	08/23/1994
	5,334,027	Wherlock	08/2/1994
	5,313,230	Venolia et al.	05/17/1994
	5,309,140	Everett, Jr. et al.	05/3/1994
V	5,299,810	Pierce et al.	04/05/1994
	5,296,871	Paley	03/22/1994
	5,286,203	Fuller et al.	02/15/1994
	5,275,565	Moncrief	01/4/1994
	5,275,174	Cook	01/04/1994
	5,271,290	Fischer	12/21/1993
	5,264,768	Gregory et al.	11/23/1993
	5,240,417	Smithson et al.	08/31/1993
	5,235,868	Culver	08/17/1993
	5,223,776	Radke et al.	06/29/1993
	5,220,260	Schuler	06/15/1993
	5,212,473	Louis	05/18/1993
	5,203,563	Loper, III	04/20/1993
	5,197,003	Moncrief et al.	03/23/1993
	5,193,963	McAffee et al.	03/16/1993
	5,189,355	Larkins et al.	02/23/1993
	5,186,629	Rohen	02/16/1993
	5,185,561	Good et al.	02/09/1993
	5,184,319	Kramer	02/02/1993
	5,146,566	Hollis, Jr. et al.	09/08/1992
	5,116,180	Fung et al.	05/26/1992
	5,107,262	Cadoz et al.	04/21/1992
	5,107,080	Rosen	04/21/1992
	5,103,404	McIntosh	04/07/1992
	5,095,303	Clark et al.	03/10/1992
	5,078,152	Bond et al.	01/07/1992
	5,075,517	Ferranti et al.	12/31/1991
	5,044,956	Behensky et al.	09/03/1991
-	5,038,089	Szakaly	08/06/1991
	5,035,242	Franklin et al.	07/30/1991
	5,022,407	Horch et al.	06/11/1991
	5,019,761	Draft '	05/28/1991
	5,007,300	Siva	04/16/1991
	5,004,391	Burdea	04/02/1991
	4,983,901	Lehmer	01/08/1991
	4,961,038	MacMinn	10/02/1990
	4,949,119	Moncrief et al.	08/14/1990
	4,934,694	McIntosh	06/19/1990
	4,930,770	Baker	06/05/1990
	4,896,554	Culver	01/30/1990
	4,891,764	McIntosh	01/02/1990
	4,868,549	Affinito et al.	09/19/1989
	4,853,874	lwamoto et al.	08/01/1989
	4,839,838	LaBiche et al.	06/13/1989
	4,837,734	Ichikawa et al.	06/06/1989
		Culver	
	4,823,634	Curver Cemenska et al.	04/25/1989 01/31/1989
	4,800,721	Centenska et al.	01/1989

Examiner	Date
Signature	Considered

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Sub	stitute for form 14	49A/PT0)		Complete if Known
TAI	INFORMATION DISCLOSURE			Application Number	
				Filing Date	Herewith
SI	STATEMENT BY APPLICANT			First Named Inventor	Erik SHAHOIAN
(use as many sheets as necessary)			necessaru)	Group Art Unit	
	(use as many s	necis as	necessary	Examiner Name	
Sheet	4	of	9	Attorney Docket Number	IMMR-046/02US

4,794,392	Selinko	12/27/1988
4,794,384	Jackson	12/27/1988
4,782,327	Kley et al.	11/01/1988
4,713,007	Alban	12/15/1987
4,708,656	de Vries et al.	11/24/1987
4,706,294	Ouchida	11/10/1987
4,689,449	Rosen	08/25/1987
4,604,016	Joyce	08/05/1986
4,603,284	Perzley	07/29/1986
4,599,070	Hladky et al.	. 07/08/1986
4,581,491	Boothroyd	04/08/1986
4,560,983	Williams	12/24/1985
4,513,235	Acklam et al.	04/23/1985
4,477,043	Repperger	10/16/1984
4,398,889	Lam et al.	8/16/1983
4,236,325	Hall et al.	12/02/1980
4,160,508	Salisbury, Jr.	7/10/1979
3,923,166	Fletcher et al.	12/02/1975
3,919,691	Noll	11/11/1975
3,911,416	Feder	10/07/1975
3,903,614	Diamond et al.	09/09/1975
3,902,687	Hightower	09/02/1975
3,623,064	Kagan	11/23/1971
3,517,446	Corlyon et al.	06/30/1970
3,497,668	Hirsch	02/24/1970
3,220,121	Cutler	11/30/1965
3,157,853	Hirsch	11/17/1964

				FOREIGN	PATENT DOCUMENTS		
Examiner Initials*	Cite	roleigh Fatent Document				Date of Publication	
mittais.	No.'	Office ¹	Number ²	Kind Code ³ (if known)	Name of Patentee or Applicant of Cited Document	of Cited Document MM-DD-YYYY	T⁴
		EP	0 626 634	A2	Yoshiaki et al.	11/1994	
		WO	95/20788			08/03/1995	
		wo	97/20305			06/05/1997	
		WO	97/31333			08/28/1997	
		EP	0265011	Al		04/27/1988	
		EP	0607580	A1		07/27/1994	
		wo	92/00559			01/09/1992	
	1	WO	97/20305			06/05/1997	
		WO	00/21071			. 04/13/2000	
		WO	00/03319			01/20/2000	
		wo	96/28777			09/19/1996	
		WO	95/32459			11/30/1995	

Examiner	Date	
Signature	Considered	

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

 ¹ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).
 ² For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
 ³ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.
 ⁴ Applicant is to place a check mark here if English language Translation is attached.

Sub	stitute for form 14	49A/PT0)	Complete if Known				
TNI	EODM ATIC	N DI	ect octibe	Application Number				
			SCLOSURE	Filing Date	Herewith			
Si	STATEMENT BY APPLICANT			First Named Inventor	Erik SHAHOIAN			
	(use as many sheets as necessary)			Group Art Unit				
(use as many sheets as necessary)		Examiner Name						
Sheet	5	of	9	Attorney Docket Number	IMMR-046/02US			

EP	0875819	Al		04/11/1998
EP	0085518	Al		01/21/1983
wo	97/21160			06/12/1997
EP	0 349 086	Al	Stork Kwant B.V.	01/03/1990
JP	H4-8381		Taito Corporation	01/13/1992
JP	H2-185278		Taito Corporation	07/19/1990
JP	H7-24147		Sega Corporation	01/27/1995
JP	H5-192449		Taito Corporation	08/03/1993

		OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
		Minsky et al., "Feeling and Seeing: Issues in Force Display," ACM 089791-351-5/90/0003, pp. 235-242 270.	
		Iwata, Hiroo, "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 165-170	
		Akamatsu et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presenace, Vol. 3, No. 1, Winter 1994, pp. 73-80	
		Hasser, C. et al., "Tactile Feedback with Adaptive Controller for a Force-Reflecting Haptic Display," Parts 1 and 2, IEEE 0-7803-3131-1, 1996, pp. 526-533	
		Hasser, C., "Tactile Feedback for a Force-Reflecting Haptic Display," School of Eng., Univ. of Dayton, Dayton, OH, 1995, pp. 1-98	
		Dennerlein et al., "Vibrotactile Feedback for Industrial Telemanipulators," 6 th Annual Symp. On Haptic Interfaces for Virtual Environment and Teleoperator Systems, ASME IMECE, Nov. 1997, pp. 1-7	
		Dennerlein, Jack et al., "Commercialization of Vibrotactile Feedback for Telemanipulation and Virtual Environments," 1997, Phase I Final Report for ONR Contract N00014-96-C-0325 (not published or publicly available)	
		Atkinson et al., "Computing With Feeling," Comput. & Graphics, Vol. 2, 1997, pp. 97-103	
		Kilpatrick, "The Use Of A Kinesthetic Supplement In An Interactive Graphics System," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1976, pp. i-175	
		Wiker et al., "Development of Tactile Mice for Blind Access to Computers: Importance of Stilulation Locus, Object Size, and Vibrotactile Display Resolution," Proc. of the Human Factors Society 35th Annual Meeting, 1991	
		Brooks, Jr. et al., "Project GROPE – Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 177-185	
		Howe et al., "Task Performance with a Dextrous Teleoperated Hand System," Proc. of SPIE, Vol. 1833, Nov. 1992	
		Rosenberg, "Perceptual Design of a Virtual Rigid Surface Contact," Armstong Lab, April 1993, pp. 1-40	
		Rosenberg, "Virtual Fixtures as Tools to Enhance Operator Performance in Telepresence Environments," SPIE Telemanipulator Technology, 1993	
		Rosenberg, "Virtual Haptic Overlays Enhance Performance in Telepresence Tasks," Dept. of Mech. Eng., Stanford Univ., 1994	
		Gotow et al., "Perception of Mechanical Properties at the Man-Machine Interface," IEEE CH2503-Jan. 1987, pp. 688-689	
		Russo, "The Design and Implementation of a Three Degree-of-Freedom Force Output Joystick," Dept. of Mech. Eng., May 1990	
		Rosenberg, "A Force Feedback Programming Primer – for PC Gaming Peripherals Supporting I-Force 2.0 and Direct – X 5.0," Immersion Corp., 1997	
		Winey III, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control," Dept. of Mech. Eng., MIT, June 1981	
		Payette et al., "Evaluation of a Force Feedback (Haptic) Computer Pointing Device in Zero Gravity, DSC-Vol. 58, Proc. of ASME Dynamics Systems and Control Div., Oct. 1996, pp. 547-553	

Examiner	Date	· · · · · ·	
Signature	Considered		

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Sub	stitute for form 14	- 49A/PT()		Complete if Known	
TAI		ANT TAT	COLOCUME	Application Number		_
	INFORMATION DISCLOSURE			Filing Date	Herewith	
SI	TATEMENT	BY A	PPLICANT	First Named Inventor	Erik SHAHOIAN	_
	(use as many s	hoots as	nocessaru)	Group Art Unit		_
	(use us many s	110013 43	necessary)	Examiner Name		_
Sheet	6	of	9	Attorney Docket Number	IMMR-046/02US	_

Ramstein, "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ACM 0-89791-776, pp. 37-44 Rosenberg et al., "The Use of Force Feedback to Enhance Graphical User Interfaces," Proc. SPIE 2653, 1996, pp. 243-248 Rosenberg et al., "Commercially Viable Force Feedback Controller for Individuals with Neuromotor Disabilities," USAF Armstrong Lab., May 1996 Schmult et al., "Application Areas for a Force-Feedback Joystick," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASM 1993, pp. 47-54 Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104 Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley	
Rosenberg et al., "Commercially Viable Force Feedback Controller for Individuals with Neuromotor Disabilities," USAF Armstrong Lab., May 1996 Schmult et al., "Application Areas for a Force-Feedback Joystick," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASM 1993, pp. 47-54 Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104 Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating	
Armstrong Lab., May 1996 Schmult et al., "Application Areas for a Force-Feedback Joystick," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASM 1993, pp. 47-54 Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104 Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 556-262 Ellis et al., "Design and Evaluation of a Fier Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
and Haptic Interfaces, ASM 1993, pp. 47-54 Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104 Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback C	
Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104 Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No	
Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993 Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Cesign of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545 Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992 Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991 Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1998, pp. 1824-1829 Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991 Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262 Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64 Millman et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493 Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993 Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
North Carolina, Chapel Hill, Sept. 1989, pp. 1-14 Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
Buttolo et al., "Pen-Based Force Display for Precision Manipulation in Virtual Environments." IEEE 0-8186-7084. Mar.	
1995, pp. 217-224	
Bejczy et al., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," IEEE CH2876, Jan. 1990, pp. 546-550	
Adelstein et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," MIT, 1992, pp. 108-112	
Kotoku et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE/RSJ Int'l Workshop on Intelligent Robots and Systems, Nov. 1991, pp. 999-1004	
Su et al., "The Virtual Panel Architecture: A3D Gesture Framework," IEEE 0-7803-1363, Jan. 1993, pp. 387-393	
Yamakita et al., "Tele-Virtual Reality of Dynamic Mechanical Model," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992, pp. 1103-1110	
Batter et al., "GROPE-1: A Computer Display to the Sense of Feel," Proc. IFIP Congress 1971, pp. 759-763	
Adachi et al., "Sensory Evaluation of Virtual Haptic Push-Buttons," Technical Research Center, Suzuki Motor Corp., Yokohama, 1994	
Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manuala Control Research," NASA-Ames Research Center/Dept. of Mech. Eng., MIT, 1992	
Jones et al., "A Perceptual Analysis of Stiffness," Experimental Brain Research, 1990	
Ouh-young, "Force Display in Molecular Docking," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1990	
Yokokohji et al., "What You Can See is What You Can Feel – Development of a Visual/Haptic Interface to Virtual Environment," Proc. VRAIS 1996	

Examiner	Date	
Signature	Considered	

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT
(use as many sheets as necessary)

Complete if Known

Application Number
Filing Date
First Named Inventor
Group Art Unit
Examiner Name

IMMR-046/02US

Attorney Docket Number

Sheet

of

	Kelley et al., "On the Development of a Force-Feedback Mouse and its Integration into a graphical user Interface," 11/94, Engineering Congress and Exhibition, pp. 1-8
	Ramstein, "Combining Haptic & Brailler Technologies: Design Issues and Pilot Study," 1996, Siggraph pp. 37-44
	Su et al., "The Virtual Panel Architecture: A 3D Gesture Framework," University of Maryland, pp. 387-393
	Ramstein et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI 1994, pp. 1-3
	Munch et al., "Intelligent Control for Haptic Displays," Eurographics '96, Vol. 15, No. 3, 1996, pp. 217-226
	Colgate et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," Northwestern University, IL 1993, pp. 1-8
	Rosenberg et al., "Perceptual Decomposition of Virtual Haptic Surfaces," Proc. IEEE Symposium on Research Frontiers in Virtual Reality, 1993, pp. 1-8
	Iwata, Hiroo, "Pen-Based Haptic Virtual Environment," IEEE 0-7803-1363-1, 1993, pp. 287-292
	Baigrie, "Electric Control Loading – A Low Cost, High Performance Alternative," Proceedings of Interservice/Industry Training Systems Conference, pp. 247-254, November 6-8, 1990
	lwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993
	Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," MIT Libraries Archives pp. 1-131, May 1990, archived 8/14/90
	Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," JPL Publication 85-11, NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985
	Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); Experimental Brain Research, Vol. 79, No. 1, pp. 150-156, 1990
	Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 IEEE International Conference on Robotics and Automation, pp. 25-44, 05/02/1993
	Snow et al., 'Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989
	Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990
	Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," MIT Archive, pp. 1-88, February 1990, archived 8/13/90
	Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993
	Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, Advances in Robotics, pp. 1-12, 1992
	Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11- 11:00, pp. 332-337
	Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, Advances in Robotics, pp. 55-61, ASME 1992
,	Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, Advances in Robotics, pp. 63-70, ASME 1992
	Kontarinis et al., "Display of High-Frequency Tactile Information to Teleoperators," <i>Telemanipulator Technology and Space Telerobotics</i> , Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993
	Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," Cooperative Intelligent Robotics in Space, Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," <i>Ph.D. Dissertation</i> , Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90
	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFTOMM, Sep. 8-12, 1981
	McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL 1988, JPL D-5172

Examiner	Date		
Signature	Conside	red	

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary) Complete if Known Application Number Filing Date Filing Date First Named Inventor Group Art Unit Examiner Name

Attorney Docket Number

IMMR-046/02US

Sheet

	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995, archived 7/6/95
	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991
	Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30- Oct. 1, 1992
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990
	Terry et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989
	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995
	Marcus, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994
	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987
	SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.
	"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).
	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90
	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," Science, Vol. 208, No. 4450, pp. 1327-1335, 1980
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," Proceedings Of Fourth CISM-IFTOMM, Sep. 8-12, 1981
	McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL 1988, JPL D-5172
	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995, archived 7/6/95
•	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," Intervention/ROV '91 Conference & Exposition, Hollywood, Florida, May 21-23, 1991
	Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration, Rensselaer Polytechnic Institute, Sep. 30- Oct. 1, 1992
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990
	Terry et al., "Tactile Feedback In A Computer Mouse," Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire, March 10-11, 1988
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," Proceedings of the 1992 IEEE International Conference on Robotics and Automation, Nice, France, May 1992
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," Journal of The Acoustical Society of America, Vol. 82, No. 4, October 1987
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," International Computer Technology

Examiner	Date	
Signature	Considered	

Substitute for form 1449A/PTO				Complete if Known		
TAI	INICODA AMYON DICCI OCUDE			Application Number		
INFORMATION DISCLOSURE				Filing Date	Herewith	
Si	STATEMENT BY APPLICANT			First Named Inventor	Erik SHAHOIAN	
(use as many sheets as necessary)			necessary)	Group Art Unit		
(use as many sheets as necessary)		Examiner Name				
Sheet	9	of	9	Attorney Docket Number	IMMR-046/02US	

	Conference, The American Society of Mechanical Engineers, San Francisco, CA, August 12-15, 1980
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," SOAR '89 Workshop, JSC, Houston, TX, July 25-27, 1989
	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995
	Marcus, "Touch Feedback in Surgery," Proceedings of Virtual Reality and Medicine The Cutting Edge, Sep. 8-11, 1994
_	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987
	SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.
	"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).
	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 195837 v1/RE 473X01!.DOC

Examiner	Date	
Signature	Considered	

¹ Unique citation designation number.
² Applicant is to place a check mark here if English language Translation attached.